and so be improperly (one-sidedly) fed. It has repeatedly been noted by observers that at insane asylums the "untidy" (the group in which my observations show scurvy and beriberi most likely to develop) were the most afflicted with pellagra. By some this supposed excessive susceptibility is explained as dependent on the untidiness which favors filth infection. The true explanation, however, is that both the untidiness and the supposed excessive susceptibility of these inmates are primarily dependent on the apathy and indifference typical of most of this group. The deteriorated mental condition causing apathy and indifference results not only in untidiness of person, but passively or actively in an eccentricity in the diet. I believe that in this, in conjunction with a diet admittedly low in the animal protein component we have the explanation of the excessive prevalence of the disease at the Peoria State Hospital, a hospital almost all of whose inmates in 1909 were of the "hopeless, untidy, incurable" class, drawn from the other Illinois institutions.

While confident of the accuracy of our observations and of the justice of our inferences, there is nevertheless grave doubt in my mind as to their general acceptance without some practical test or demonstration of the correctness of the corollary, namely, that no pellagra develops in those who consume a mixed, well-balanced, and varied diet, such, for example, as the Navy ration, the Army garrison ration, or the ration prescribed for the Philippine Scouts.

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Respectfully,

JOS. GOLDBERGER,
Surgeon in Charge of Pellagra Investigations.

THE TREATMENT OF PELLAGRA.

CLINICAL NOTES ON PELLAGRINS RECEIVING AN EXCESSIVE DIET.

By W. F. LORENZ Special Expert, United States Public Health Service, and Director Wisconsin Psychiatric Institute.

I desire herein to report some striking and suggestive observations on the effect of forced feeding on the course of pellagra. An excellent opportunity to observe this effect was given when through the generous cooperation of the Georgia State Sanitarium an entire ward of colored females was placed under my supervision.

An average of 48 patients was maintained in this ward for a period of 8 weeks. All of the inmates of this ward were kept, as far as was possible and practical, under identical conditions. The pellagrins

were kept in bed during the greater part of their residence in the ward; the nonpellagrins, of course, were up and about.

In all, 27 acute cases of pellagra were treated in the ward. Of these 7 died, 3 were unchanged, 13 had improved, and 4 were designated as recoveries. In these latter cases all visible evidence of pellagra had disappeared and the mental condition had cleared up entirely.

In 6 of the 13 cases designated as improved recovery in the mental state occurred. That is, where these patients had been more or less completely disoriented, confused, and apprehensive, with both visual and auditory hallucinations, practically no retentive powers, and, as a consequence, very defective memory, they became clear, realized their surroundings, oriented themselves, their apprehension subsided, and their ability to retain impressions was unimpaired. They had no memory for the period of delirium and but a very hazy recollection of the period during which they had been confused. These patients all had insight into their conditions; that is, they realized they had been ill and mentally upset for a period at least.

The remaining 7 of the 13 cases designated as improved also showed an improvement in the mental condition, but not to so marked a degree as in the 6 cases first mentioned. Certain of these cases were patients in whom pellagra had been superimposed on an already existing psychosis of a chronic type. No change could be noted from the mental condition that had existed previous to the occurrence of pellagra. Their improvement was in the physical manifestations of pellagra, although slight roughening and thickening of the affected skin, particularly over the knuckles, persisted.

In 3 cases very little change occurred. One was an old case of paresis in which pellagra developed. The skin manifestations in this case were still marked after a period of 8 weeks, though the stomatitis had improved very much. The same was true of the other 2 cases of this group; the skin lesions persisted and bowel disturbances occasionally recurred.

Of the 7 cases that died, 2 were complicated by severe physical diseases. In one of these an uncompensated heart lesion, with pulmonary tuberculosis and marked edema of the lower extremities, hastened death, while the other had a mitral and aortic insufficiency, with an irregular, dilated heart. Three of the cases died very suddenly after brief periods. In 2 cases death occurred 8 days after their admission to the ward and after about 2 weeks of illness, and in the third, six days after admission, the total duration of the illness in this latter case being unknown. The 2 remaining cases that died were inmates of this ward and under treatment 11 and 36 days, respectively. Both were unusually severe cases, with extensive

sloughing of the skin involved and severe stomatitis, salivation, and persistent diarrhea.

The treatment employed in these cases of pellagra was, with few exceptions, simply a generous diet and rest in bed; none received any of the arsenicals. Six of the cases received at various times bismuth subnitrate; others were occasionally given castor oil and at times soapsuds enemata. The cases with stomatitis were given an antiseptic mouth wash. The moist lesions were treated with a wet dressing of magnesium sulphate, and the few patients who could not take the solid food that was supplied were given 1 ounce doses of an emulsion of cod-liver oil three times daily.

The diet supplied these patients consisted of the following:

For breakfast: One or two eggs, one-fourth pound fresh beef (usually fried as steak), wheat roll, coffee with milk and sugar, frequently oatmeal with milk and sugar, and an additional 8 ounces of milk.

For dinner: Fresh beef (one-fourth pound, either roasted, boiled, or fried), Irish potatoes, rice, onions, squash, and any green vegetable that could be obtained, such as cowpeas and cabbage. Wheat bread daily; corn bread twice a week; coffee with milk and sugar.

For supper: One or two eggs, wheat bread, coffee with milk and sugar, and an additional 8 ounces of milk as desired.

Milk was also supplied between meals whenever the patient desired a drink. It must be mentioned that the one-half pound of beef supplied these patients consisted of good, lean, fresh meat; no bone.

In a few instances the patients required considerable urging to take all the food supplied. Several were in such a mental condition that solid food could not be given. In such cases eggnogs, albumin water, milk, rice gruel, etc., were freely fed by spoon, the purpose at all times being to give as much nourishment as possible.

The improvement attributable to this generous diet manifested itself, on an average, about four weeks after it was instituted. As a rule, the mental and nervous symptoms were the first to change; bowel conditions would, as a rule, improve within two weeks. The skin manifestations were the last to change; when once started, however, the cutaneous lesions would improve daily. Large granulating areas healed more promptly than one usually observes. During the period of improvement an increase in bodily weight occurred and the entire aspect of the patient changed for the better.

The effect of this diet on the bowel conditions was certainly not injurious; that is, the diarrhea that was present in the cases that received no medicaments was not aggravated and persisted no longer than in the cases that received astringents. Constipation was possibly somewhat aggravated in a few instances.

Conclusions are not warranted from this limited experience. It must be borne in mind that we are dealing with a disease with apparent tendency to recurrence. Frequently it appears to clear up under divers conditions, so that the term "recovery" must, until we know better, refer to the immediate condition under observation. Similarly the use of solid food in every case of pellagra may be inadvisable or impracticable; for instance, when very severe stomatitis is present. The unusually favorable experience with the severe cases herein reported on would, however, suggest the inference that diarrhea in itself is no contraindication to the use of solid food, even in large amounts, that a generous diet seems to have a decidedly favorable effect upon the course of pellagra, confirming an observation that had been made even before Strambio's time. It is evident that the arsenicals at present so much in vogue may be dispensed with without harm, if not actual benefit to the patient.

THE CEREBROSPINAL FLUID IN PELLAGRA.

By W. F. LORENZ, Special Expert, United States Public Health Service, and Director Wisconsin Psychiatric Institute.

While pellagra has been very diligently investigated, relatively little attention has been directed toward the cerebrospinal fluid. The few contradictory reports that have appeared in this connection suggested the advisability of further investigation in this particular field.

In 1912 Boveri (1) reported a series of examinations and concluded that a slight lymphocytosis and an excess of globulin were present in the spinal fluid. Hindman (2) made a somewhat similar report in the same year. Buhlig and Holmes (3) made a contradictory report from three cases, and Dudgeon (4) also found a negative fluid in the two fatal cases of pellagra reported from England. In a later report Hindman (5) attributes some of his former finding to syphilis, and claims that after his cases of pellagra were controlled by Wassermann examinations practically none showed a lymphocytosis.

The data contained in this report were obtained from 153 spinal fluid examinations made in 106 cases of pellagra. Practically every clinical type of pellagra is represented in this series. Very acute cases, with severe mental and physical manifestations, contribute the largest share. On some of these a second puncture was made after the acute condition had subsided. In a number of cases a third confirmatory examination was made after an interval of several months. This series also includes a number of cases that showed very little or no mental disturbance.